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ABSTRACT

The present situation and future trends of programed learning in Ceylon, Republic of China, India, Indonesia, Japan, Republic of Korea, Malaysia, Pakistan, Philippines, Singapore, Thailand, and Republic of Viet-Nam are described by the Workshop participants. Some of the unique features of programed learning are examined with respect to the specific needs of the developing nations of Asia. Data obtained from a questionnaire circulated at the workshop is summarized giving the participants' views concerning the general problems of utilizing programed instruction in their respective countries. Suggestions are offered to assist the Asian nations in introducing programed instruction, training producers and users, identifying priority subject areas, developing needed hardware and software, producing programed materials, conducting research, and disseminating information. The role of national governments and the United Nations Educational Scientific and Cultural Organization (UNESCO) in fostering the cause of programed instruction is discussed. Plans for the future include establishing a consulting committee for UNESCO, grouping interested countries for cooperative programs, and offering training courses. (JY)

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WORKSHOP OF THE EXPERIMENTAL PROJECT ON PROGRAMMED INSTRUCTION IN ASIA

Tokyo and Osaka, Japan

12 February - 14 March 1970

F I N A L R E P O R T

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CHAPTER I

INTRODUCTION

1. Background

The General Conference of Unesco at its 15th session (Paris, October-November 1968) authorized the Director-General to "continue the activities initiated to promote new methods and modern technology in education, especially in the use of programmed instruction ..."(15C/Resolution 1.251 (c)).

Following the success of the experimental project in the field of programmed instruction launched for the French-speaking countries of Africa in 1967, the second experimental project was organized by Unesco for the English-speaking countries of Asia in collaboration with the Japanese Government which offered to act as host.

2. Objectives

The experimental project comprises the following three phases: (1) Workshop on programmed instruction with the participation of educators and specialists in programmed instruction and educational administrators from selected Asian countries; (2) Preparation, production and experimentation of programmed courses by the participants in their countries as follow-up of the Workshop; and (3) Follow-up meeting of the participants of the Phase I Workshop to evaluate the result and to work out a plan of further action.

The objective of the Workshop is to exchange information on the present development of programmed instruction in Asian countries; to familiarize the participants with new developments including computer-assisted instruction; to prepare programmed courses especially adapted to the needs of their respective countries in subjects taught at the lower secondary level of education such as mathematics, science and English; and to plan further international co-operation among the Asian countries for the promotion of innovation in educational methods and materials.

3. Time and location

The Workshop of the Experimental Project on Programmed Instruction in Asia was held in Tokyo and Osaka, Japan from 12 February to 14 March 1970. The opening ceremony was held on 12 February at the Akasaka Prince Hotel, Tokyo, and from 13 to 18 February the Workshop took place at the Todofuken Kaikan, Tokyo and from 19 February to 4 March, at the Osaka Science and Technology Centre. Then, the Workshop took place again at the Todofuken Kaikan, Tokyo, from 6 to 14 March.

4. Activities during the Workshop

The work of the Workshop comprised the following types of activities:

(1) Reports by participants on the activities in their countries in the field of programmed instruction.

(2) Lectures by Unesco Consultant and the Japanese experts, and discussions based on the lectures.

(3) Practice on frame writing in such subject matters as mathematics, natural sciences, social sciences and English.

(4) Practical works by using programmed materials and teaching machines.

(5) Discussions on problems in development of programmed instruction and future development in Asian countries.

(6) Preparation of suggestions concerning the future national and regional activities.

(7) Observation visits to schools at which programmed instruction is being carried out, and business firms producing teaching machines.

To ensure the effective conduct and the smooth running of the work of the Workshop, the Steering Committee was established. The list of members of the Committee is given in Annex 3.

5. Participants

Invitations were sent by the Director-General of Unesco to two specialists each from eleven countries to attend in their personals capacities, and also to a number of observers. The names of the participating countries were as follows: Ceylon, Republic of China, India, Indonesia, Republic of Korea, Malaysia, Pakistan, Philippines, Singapore, Thailand and Republic of Viet-Nam. Japan, as host country, was also represented by two participants.

The list of participants and observers is contained in Annex 5.

CHAPTER II

PROGRAMMED INSTRUCTION IN THE ASIAN REGION: PRESENT STATUS

1. At the commencement of the Workshop, reports were presented by the participants describing the present situation and future trends of Programmed Learning in their respective countries, namely, Ceylon, Republic of China, India, Indonesia, Japan, Republic of Korea, Malaysia, Pakistan, Philippines, Singapore, Thailand and Republic of Viet-Nam.

2. On the basis of the information presented in the reports, the participating countries can be classified into three categories in terms of stages of development of Programmed Instruction.

3. Exploratory Stage: The group of countries at this stage have either recently started or are planning to start exploring the possibilities of introducing programmed instruction. They are looking with keen interest at the potential of programmed instructions in solving the problems of quantitative development and qualitative improvement of education. Programmed Instruction is at exploratory stage in Ceylon, Indonesia, Malaysia, Pakistan, Philippines, Singapore and Vietnam.

4. Preparatory Stage: A number of countries in the Asian Region such as the Republic of China, Korea and Thailand can be best described to be at the Preparatory Stage of development of Programmed Instruction. These countries seem to have gained confidence regarding usefulness of P.I. and are enthusiastically preparing to launch important institutionalised schemes of preparing, adapting and utilizing Programmed Instruction materials.

5. Maturation Stage: India and Japan were the countries represented in the Workshop which can be safely described as having reached a stage of maturation (though not maturity). These countries have well established institutionalized arrangements for the production of materials and research. They have remarkable diversity of areas of interest and professional associations for Programmed Instruction have also appeared on the national scenes.

6. In the following paragraphs 7 - 25 brief descriptions are presented of the status of Programmed Instruction in the participating countries in the order of the stages of development mentioned above.

Ceylon

7. Programmed Instruction is not being used in the schools of Ceylon but in one of the universities of Ceylon. An earnest effort is being made to promote a detailed study of the use of Programmed Instruction among the

students following post-graduate courses in education with a view to dissemination of knowledge among teachers. Attempts are being made to popularise available programmed materials among students, parents and teachers by producing them in local languages.

Indonesia

8. The concept of Programmed Instruction came in Indonesia in 1963. Since then a few articles and pamphlets have been published. Practically, Programmed Instruction as a part of instructional activities is non-existent in Indonesian schools but at present it is assumed that a portion of the teaching force is ready for participating in an experimental stage of Programmed Instruction. An encouraging sign is that educational leaders are beginning to realize the importance of Programmed Instruction. The plan ahead is the overall evaluation and restructuring of education including the introduction of modern techniques of educational technology. The Government is currently taking steps in setting up an organization for text-book writing where the possibility of developing programmes in Physics, biology, chemistry, mathematics, vocational and technical education, social studies and language arts is being considered. The Directorate of Education is now supposed to introduce programmed teaching-learning principles to the existing teacher education institutions as part of their teaching and learning interaction programmes.

Malaysia

9. Programmed Instruction is new in Malaysia. In developing new curricula especially in Science and Mathematics, there is a new mandate to look into the curriculum spelled out in behavioural terms. Malaysia intends to go ahead and experiment with Programmed Instruction but it may take a few years before something definite materialises. The university primary school in Kuala Lumpur, an experimental school, uses this sort of instruction but in its most rudimentary stages.

Pakistan

10. Pakistan has just started realizing the significant role of instructional technology in improving the teaching-learning situation. At present two experimental projects have been undertaken by the Family Planning Boards and the Department of Psychology and Education at the University of Peshawar. The Institute of Education and Research, University of the Panjab at Lahore is starting a feasibility study project on Programmed Instruction. The objectives of the project will be to explore the success of P.I. in other countries, to identify subjects, stages and types of education and training where P.I. could be most immediately useful, to explore the relative cost effectiveness of P.I. as compared with traditional methods of instruction, to examine the administrative implications of the P.I. project, to examine and recommend the physical and financial size of the subsequent P.I. project for the consideration of the Government of Pakistan.

Philippines

11. Programmed Instruction is something new in this country. Some scholars are sent abroad to study this new technique of instruction. In one teacher training college the production of some "software" materials has been undertaken on experimental basis.

Singapore

12. The concept of Programmed Instruction is not a very new thing in Singapore but it has not been translated into any form of directed action in the national school system. There is a Regional English Language Centre in Singapore which develops and produces diagnostic and achievement tests, laboratory programmes and self-instructional materials in English Language. Some preliminary efforts have been made at the teachers training college to introduce Programmed Learning to the trainee teachers. Samples of rudimentary teaching machines and programmed texts are used to illustrate and demonstrate this relatively new technique of learning. But besides this no extensive try out has really been attempted. One reason was that one-third of the resources were diverted for the massive expansion of technical and vocational education. The Singapore school system is quadruplicated in four language streams. This means that every innovation has to be quadruplicated languagewise.

13. It is premature to predict when teaching machines and programmed learning will be introduced into the Singapore school system but provided right encouragement and material support exists, Singapore will be ready to experiment in this field for the improvement of quality of education because the problem of quantity has already been tackled. A quick response can be expected because cultural inertia as main obstacle is non-existent in Singapore.

Viet-Nam

14. The concept of Programmed Instruction is known in Viet-Nam and a few educators have had training abroad in the technique but at the practical level only a few individual experiments have been conducted within the limited scope of a few class-rooms or selected groups of students. The educators of Viet-Nam are hoping to obtain a strong backing by top authorities and a widespread dissemination of the method is scheduled to be made throughout the educational institutions of the country.

Republic of China

15. In the Republic of China, Programmed Instruction was introduced in 1959, and several high school teachers were sent abroad to study Programmed Instruction. The Ministry of Education established institutes to develop and administer the Programmed Instruction. The movement, however, is not yet independent but is a part of teaching aids and language laboratories.

16. At present the Republic of China has a National Education Materials Centre, responsible for collection, compilation and distribution of all kinds of education materials including audio-visual teaching aids. Universities are also helping in promoting Programmed Instruction. Various centres are established in universities such as Audio-Visual Centre, Audio-Visual Education Institute and Social Sciences Materials Centre. National Audio-Visual Education Association of China is playing an active part. Thirty-nine language laboratories in universities and colleges, seventeen laboratories in high and elementary schools are working on Programmed Instruction.

17. Future plans are to establish more language laboratories, to build more Pressey model teaching machines in some selected junior high schools for teaching and self learning in the areas of mathematics, Chinese history and science.

Korea

18. Programmed Instruction is well known in Korea and is now under serious and enthusiastic study with the Education Centre and KIRBS (Korea Institute of Research Behaviours Science). In 1969, nine schools, playing a most active part, divided the subject of mathematics and English among themselves and completed under the guidance of KIRBS. Now 40 schools in the capital and 20 schools in the provinces are busy in preparing for the completion and practice of programmes including science besides the two subjects mentioned above. Development of Programmed Instruction has been stimulated in junior high schools, because of a free-of-examination system introduced from 1969 in the capital and in 10 other cities from 1970. As a consequence of the free-of-examination system school-classes consist of different quality groups in learning and in I.Q. demanding more and more of individualizing techniques and hence Programmed Instruction. This technique of instruction is expected to prevail all over the country in the near future.

Thailand

19. The Thai education system began to be interested in Programmed Instruction in 1964 and the Ministry of Education appointed a committee to explore the possibility of introducing this innovation. The committee recommended that mechanized Programmed Instruction was beyond the reach of Thailand, but programmed text-books meeting the requirements of the theory of programmed learning could be effective. On the recommendation of the Committee, the Ministry organised a team of four specialists to produce a programmed text-book of Algebra for class 8th, but responses of secondary schools were unfavourable. Since then no further attempt was made until 1969. With external assistance a work plan was formulated from July 1969 to July 1970 for seminars and for the production of programmed materials under the guidance and supervision of specialists in this field brought from

abroad. Five trainees were selected and sent abroad for a period of three months. In early 1970, the Department of Educational Techniques launched an Experimental Project on Programmed Texts. At present different teams are busy in preparing the materials to meet the targets set up for this project. On the whole, Programmed Instruction is a new thing to the Thai educational system.

India:

20. India, like Japan, is at maturation stage of Programmed Instruction although the development here is more in "software" materials for obvious reasons. Up to 1962 there was no organized effort towards utilizing findings pertaining to Programmed Learning. In 1963 some educationalists thought of this new technique as a solution to the educational problems and in the same year two educationists participated in an International Conference. In 1964-65 NCERT took Programmed Instruction as major national project and in 1966 the first professional body "Indian Association for Programmed Learning" (IAPL) was formed. During the last four years, various local branches and similar professional bodies have been formed. NCERT has offered four major courses for programmers, two short-term courses for school teachers and has developed several programmed texts. Some universities are using programmed learning and have offered zonal seminars with the result that the interest for PL has gone up. Some universities have started encouraging research in PL and others are thinking of introducing it. At present many different organizations are working for programmed learning. Seven different journals are published in the area of PL. Many research studies have been conducted on such topics as the relative efficiency of the conventional and the programmed methods of instruction, teachers'role in PL, correspondence training, teachability of subject matter taught in higher classes to the lower classes, effectiveness of PL by TV and radio, possibility of PL techniques to groups in view of the expensiveness of the method.

21. Mathematics has been the most popular,and the languages the least,among the programmers. Recently, however, great interest seems to be developing in the area of language programmes.

22. The IAPL is planning to organize special short term courses for industries in the near future.

Japan

23. It was in 1958 when the theory of programmed learning and the concept of a teaching machine were introduced in the Japanese educational system by a Japanese educational leader. More details of the teaching machine were presented by an American Professor in a Seminar and in 1959, the first teaching machine was constructed. Many teachers started to programme several types of subject matter for the machines, but no teaching machines were sold because they were pretty expensive. In the beginning, the procedure of PL was not understood by many of the teachers, so much poor

programmed material was published in the name of PL even without a tryout which failed to educate the learner. So many teachers were disappointed and many criticisms were made on PL, but a few teachers who believed in the effectiveness of this method, continued to develop programmes of some subjects.

24. The excellence and effectiveness of the method proved through experimental studies in research institutes and universities popularized the technique once again. In 1966, the programmed learning was adopted by the training system of military and industries. At present in primary schools programmed learning is present on a limited scale only. In junior high schools, it is most popular while in senior high schools the scope of operations is limited because of the short supply of programmed materials. Several university professors have been leaders in this field and conducted much research. Programmed learning materials are available either in the form of programmed books or programmes for teaching machines. As to the teachers' organizations more than fifty associations of programmed learning have been organized in many parts of Japan and more than eighty educational research institutes out of about one hundred are carrying out experimental studies on programmed learning and teaching machines.

25. As a highly industrialized society, Japan seems to have good potentiality for programmed learning. The Ministry of Education started a new project of support for experimentation in educational technology at elementary and secondary school levels. The number of experimental schools designated is still small, but it will be enlarged in the near future. Some local educational authorities, too, are planning to encourage such educational investment. Training of teachers may be emphasized in the development of educational technology as well as any other field in education.

General Patterns.

26. From a detailed study of the report, apart from the stages of development of Programmed Instruction, certain interesting patterns of organizations, operations and activities have emerged which will be described briefly in the following paragraphs.

27. Two patterns of organization for the expansion and integration of programmed instruction were described: a centralized organisation, by which programmed instruction is developed as a policy making element by the central educational authorities, with state resources. This is, in general, the situation for curriculum development, educational planning, etc. A wider framework of general educational development established at an official level may well provide the most sympathetic atmosphere for the development of new materials, training of personnel in the new techniques and established channels of communication ensuring the introduction of materials into the classrooms. Most participants indicated that at least a strong element of central support was necessary for the introduction of innovation on a satisfactory scale.

28. Another pattern was a decentralised movement, based on the spontaneous federation of individual or local effort, gathering together diversified local contributions, and fostering initiative at all levels. The successful and widespread development of programmed learning would seem to require some sort of permanent centres of development. These centres would need a well-equipped library and the facilities necessary for meetings for discussion and training. They may well be found in Universities, Colleges, National Institutes concerned with the civil service, the professions, industry and so forth. Some sort of professional association would provide a communication channel between these centres and inform and encourage individual and more modest group efforts. It would seem that this has been the pattern of development in India.

29. In view of many difficulties, generally expressed, it was encouraging to receive reports of particular projects which had, nevertheless, been established. In India, the four courses which have now been held since 1965 at the National Centre for Educational Research and Training have produced some 160 programmers. Training courses were established even earlier in Japan, although initial efforts were through military and industrial training rather than general educational development.

30. In other Asian countries training has been established on a more modest scale. Several universities and other institutes for the training of teachers have been involved, and some in-service training for high school teachers was reported. In Indonesia, for example, there have been some university courses in classroom methodology which have included some study of programmed instruction since 1963.

31. Several high school teachers from the Republic of China have studies abroad audio-visual education with special emphasis on programmed instruction, and participants from other countries, for example, Ceylon, Singapore, Thailand,described similar schemes. While the numbers involved have, so far,been small, it is hoped that some of the urgently needed local experts may be found among them.

32. Similarly, research projects seem to have been established earlier in Japan and in India. The present centres of interest are: the optimal step size of programmes, mode of response, effect of knowledge of results, comparative studies of varieties of use of programmed materials, interaction with intelligence levels and the design of teaching machines. In India, initial research efforts were concentrated on the comparative efficiency of conventional and programmed instruction. Later, studies centred on the changing concept of the teacher's role brought about by programmed methods of instruction. Although the bulk of research has been of an applied nature, there has been some fundamental research, particularly concerned with investigating the information analysis for concept programming.

33. There is considerable variety in the form of the programmed materials which have been developed so far. In some countries, for example, the Republic of China, there has been a concentration on the development of materials for machine presentation. Others, such as India, have used various types of programmed text-books, and explored their use in individual or group study in the classroom, or for home study or review. In Japan, the possibilities of machine presentation have and are being thoroughly explored. The most popular machines have been the Synchofax and the Stepcoder. This emphasis has culminated in the present study of computer assisted instruction. Programmed texts have also been widely used, however.

34. Some countries have introduced programmed learning through translating programmes which have already proved to be successful elsewhere. Robert Nager's programme on the preparation of instructional objectives was, for example, one of the first programmes to be available in the vernacular in Thailand. More commonly, programmes in science, mathematics, and also language arts have been adapted. These programmes could be made available quickly, did not require costly presentation devices, and consequently seemed to offer an appropriate strategy for initial effort.

35. The problems of adaptation of programmes produced elsewhere were well appreciated by participants. If the students lack facility in the language of a foreign programme, he may well be unable to comprehend fully the subject matter presented in a particular frame. The problem may well not be resolved through translation, particularly if the translator lacks expertise in the subject matter being presented, or the techniques of programmed writing. It is generally appreciated that adaptation should be carefully done, and various experts should be involved, as with the development of complete programmes. Much time in duplicated effort can, however, be saved by having such teams adapt programmes for national use from an international "bank".

36. Several possible focal points where future activities might be concentrated were described. It would seem that the following are already apparent in most countries and could serve simultaneously as centres of development. It was generally agreed that programmed learning should be considered wherever curriculum development is proceeding to the benefit of each. On the one hand, training of the techniques of programmed learning have a wider validity and on the other it is preferable to apply these techniques to revised curricula. Different approaches have been described. It is possible to use programming as the organizing principle. A model of teaching and learning compatible with programmed learning could be applied to the whole curriculum so that, for example, objectives and tests were matched. Alternatively, the presentation aspect of programmed learning might receive initial emphasis, so that it was first considered as a practical implementation of curriculum development in the form of new teaching materials. These approaches were not thought to be mutually

exclusive, and the preparation of some detailed programmed materials within a general framework of curriculum development organized around the same basic principes was considered to be the most fruitful.

37. There was evidence that some teacher training institutions have introduced programmed learning, and that many more are considering doing so. It was considered that this should now be the general case, and that student teachers should become aware of both the fundamental and the practical aspects. Programmed learning should be integrated into their studies first as a demonstration of scientific approaches to learning, correlating objectives, contents and controls, and secondly as future practice in everyday school activities.

CHAPTER III

PROGRAMMED INSTRUCTION IN THE ASIAN REGION: PROSPECTS AND DIRECTIONS

1. Programmed learning has developed rapidly during the last ten years. It has evolved from a network of ideas and developments from a variety of fields, so that it has moved away from the narrow conception of the early theorists. Its true role as a major component of the new educational technology is now recognized and the prospect it offers to escape from rigidity and wastefulness of traditional class teaching is welcomed.

2. The new techniques of education technology have opened the way to better, cheaper ways of achieving educational objectives. The long established assumptions of traditional educational approaches are under scrutiny. The necessity for a teacher-pupil ratio of I to 35; the number of years for a basic primary education; the costs of building, maintaining and equipping schools of traditional design, in use for a few hours a day, for only parts of the year: these and similar questions are being considered anew.

3. The new media of communication have made possible the industrialization of education. Their development over the world is uneven, but there are a few places where radio is not available. Radio lessons reaching homes or village centres, with packages of self-instructional materials to accompany them, are anticipated as the educational analogue of industrial mass production.

4. It may be tempting to consider that by making a master teacher available to 500 classrooms instead of one, television and radio can solve the problems of mass education. But investigation into the lecture method indicates that only about one person in eight of an audience is actually paying full attention to it at any particular time. Clearly the use of radio and television can expand the audience, but it is of little avail to do so when the teaching method is ineffective.

5. Efficiency in education is achieved when it is appreciated that learning is something that is done by, not to, a student. Solutions to educational problems are successfully achieved through the careful definition of the objectives of instruction so that the final responses, concepts, skills and attitudes of the student are identified. This exercise results in the creation of an environment in which the student will be able to direct his own activities to the attainment of objectives.

6. The new sophisticated presentation media cannot be assumed to guarantee successful learning. Television, radio, tape recorders, slide projectors and teaching machines of every kind, are means to desired ends. Considered

together they make possible a multi-sensory approach, which enables lessons to be repeated, stored, revised and made available to large numbers of students. But the essential elements which are necessary for success are the careful analysis of tasks to be mastered and the subsequent careful sequencing of meaningful learning experiences.

7. These techniques of analysis of objectives and careful sequencing of subject matter were developed through programmed learning but now have much wider application. Conventional programmes, and other learning packages have merged, so that the definition of programmed learning has undergone review and the advantages of the essential techniques are of wider application. These advantages are concerned with the improvement of the rate and amount of learning achieved. Incorporation of practices which improve the quality of learning can be justified even when they are more expensive; but it does so happen that these techniques of programmed learning lead to the saving of costs through reducing demands on space, costly materials and teaching staff. Cost benefits are difficult to analyse; but it is indisputable that the individualisation of learning enables a smaller classroom and fewer pieces of expensive equipment to be used for more extensive hours during the day.

8. In some developed countries this cost saving could be a mere happy bonus; in the countries of Asia the quantitative problems of education are so overwhelming, that economy measures become top priority ends. There is the ever-present need to balance the requirements of a basic primary education for all with the higher and technical education of the few, and it may well be that the possibility of greater cost efficiency may be the overriding factor determing the introduction and adoption of these techniques. But there is a general realisation of the alarming nature of the qualitative problem of education in Asia too. Almost universally, the objectives of each country's educational programme are being re-examined in the light of the needs for skilled manpower and the political development of each nation. Wherever expansion is planned, there is concern that there should not be an accompanying dilution of standards.

9. The total aggregate of problems, both qualitative and quantitative, in educational development would seem to be overwhelming. In some countries not even long range solutions would seem to be available. Where there seems to be no possibility of building enough schools for all children at every stage of development, or training the teachers to staff them all, choices must be made to concentrate on one educational problem at the expense of the other.

10. These problems have been considered to be unsurmountable because they have so far been considered in terms of traditional solutions. The fact that the new techniques have caused these solutions to be questioned so seriously can give great encouragement to those concerned with educational planning in developing countries.

11. The comparison of costs of established traditional courses with the new approaches is difficult to make. The introduction of programmed learning materials to replace a conventional lecture might seem to increase the financial demands of the course by just their cost. But the availability of associated materials and use of expert staff must also be considered. When introduction is individualized it is safe to assume that only a few students will be at the same point at the same time, so only one or two expensive items of equipment can be used by a large number of students.

12. It may well be the case that few pieces of expensive equipment were available in the conventional course which is being replaced. In this case, the cost benefit might well be considered in terms of replacing demonstration by individual experimentation, rather than in an absolute reduction in apparatus used.

13. Similar considerations concern the availability of well qualified and experienced teachers. Where these are in short supply, it is unlikely that the introduction of new methods will reduce the number that can make a full contribution to the course. But the new methods provide an opportunity for inexperienced, or less well qualified teachers, to supervise learning in a situation where they will be asked to discuss problems and difficulties with which they cannot.

14. Similarly, a much heavier commitment of time by master teachers and others, concerning the structuring of a unit of work and its development so that it can be used repeatedly in a self instructional manner is justified in terms of the wider student population reached. The new techniques should not be considered to replace staff, but rather that they maximise the possibility of good teaching when the number of expert staff available is few.

15. It was suggested at an early stage that programmed learning would be of special benefit to developing countries. In 1964 Schramm said "to a developing country, short of trained teachers, schools, programmed learning is especially attractive. Because one must look very hard at contents and methods in order to make programmes, it is also attractive to new countries concerned with the re-study and revision of curricula". Others have warned of the dangers of importing materials from other countries without trial or adaptation. Even within a particular country the language of instruction can cause problems when socio-economic levels are changed. The "cultural translation" of programmes written for another country will require more than the changing of the language, and although students at college level can still benefit from unadapted programmes, careful translation is essential for younger students.

16. Neither the programme nor the presentation devices can be imported and imposed. Development has to be indigenous to be effective and lasting. This implies that there should be available local experts familiar with the techniques of programmed learning and educational technology, specialists in their particular subject matters and aware of recent developments. It would seem that provision of such local expertise should be considered as a priority, and the establishment of programmed learning in Asia should be considered in terms of the training of personnel, preparation of materials, research into associated problems and dissemination of information. The prospects of programmed learning in Asia will be considered in those terms.

17. Since in most Asian countries the technique has not yet taken root, it will be necessary to emphasise in the first instance extension and research activities, to be closely followed by a series of training at various levels. In the section below certain possibilities in different areas are indicated. The possibilities are reflected throughout the report in various sections.

18. Primary Education: a) In most Asian countries large scale curricular reform at the primary stage has been either proposed or implemented. New curricula in Science and Mathematics pose considerable difficulties for established primary school teachers for usually they are not yet fully familiar themselves with all the new subject matter to be taught. It is, therefore, necessary to evolve certain systems of training of primary school teachers in the form of in-service training or self-instruction. In either case programmed material will be of great help.

19. b) The number of single teacher schools in some major Asian countries is large. The teachers concerned require time for their administrative duties, and the application of educational technology could allow them to cater for the needs of a wide range of pupils with a minimum of supervision.

20. c) Since considerable portion of the instruction in Asian Region at the primary stage is not through the medium of mother tongue, the problem of language and communication cannot be ruled out. A large proportion of the primary school children are exposed to a bilingual situation. In such cases also programmed material will be of great help, firstly as a filter of communication from the medium of instruction to the mother tongue of the child and secondly in the form of remedial instruction for incomplete communication already transacted in the class. Therefore, the possibility of providing programmed experience and programmed texts for the use of the primary school student cannot be ruled out.

21. Secondary Education: a) The problems outlined in the section above exist to some extent in the area of secondary education also. Additionally, the allocation of time is not usually proportionate to the demands of the units to be covered during the secondary stage of education. It is unlikely that a thorough analysis of the task on the lines of programmed instruction may reveal very useful data about the present allocation of time and resources.

22. b) Many Asian countries are currently considering curricular reform in secondary education. Often curricular reforms are done through non empirical methods, depending heavily upon experience of the planners. In this context programmed instruction provides some empirical basis for calculating the network of shaping behaviour among various information inputs during the secondary education. Such exercises may provide guidelines for curriculum planners.

23. c) A large number of instructional units may be easily converted from standard programmes that are available either commercially or through professional bodies. Large scale adoption of programmes, in the various Asian languages will, therefore, be advisable and useful for secondary education.

24. Higher Education: The reaction of professional educators to the possibilities of programmed instruction for higher education remains divided in that some feel that it is useful only for higher education, whereas some others tend to believe that it is not so useful for this level. The fact, however, remains that provided the objectives of higher education are fully defined, the possibilities of programmed instruction remain the same for this as for any other field. In higher education, an inter-disciplinary approach has recently been emphasized. Much information not directly pertaining to one's own discipline may require inclusion in the educational activities of higher education. In this context mathematical information for the social sciences may be cited as an instance. In such cases it is not always possible to take the instruction of these fringe areas into the field of regular instruction and it may be advisable to provide programmed texts or lessons for self instruction of the student, to be supplemented by directed readings in the libraries. Particularly for instruction in mathematics which cuts across most of the natural and social sciences, wide scope exists for production of such programmed material.

25. Teacher Education: a) The school teacher in the Asian Region is often said to be of considerably lower quality level than his counterpart in more developed regions of the world. The teacher training instructions are, of course, trying to reduce this differential. However, information in subject matter is not yet emphasized in the teacher training institutions, as much as matters pertaining to the methods of teaching. In this context, programmed texts for the use of the teachers may be of great value in improving their competence as subject matter specialists.

26. b) In the Asian Region knowledge of educational evaluation among teachers requires much more attention than is currently given. Side by side with the schemes of evaluation stand the new techniques of evaluation including statistical analysis. In the teacher training institutions of the Asian Region this does not yet receive due emphasis. It may, however, be beneficial to provide programmed texts for evaluation and statistics for the teachers. Compilers of correspondence courses for teacher education may find the techniques particularly useful.

27. Functional Literacy: The literacy figures of the Asian Region are still alarmingly low, and there is a general concern about this problem in most Asian countries. Fortunately, programmed material can go a long way in economising the efforts in this regard and optimising the results. In some Asian countries such as India, plans have been developed along these lines and initial results of individual efforts have been encouraging.

28. Health Education and Population Education: Most Asian countries are concerned if not alarmed at the prospect of a population explosion, and the various governments are concerned about population education both in and out of the school situations. In India, programmed texts on population education for family planning workers have been developed and have yielded rewarding and encouraging results. It may be worthwhile to develop programmes about sanitation, nutrition, first aid, child rearing, use of contraceptives and such other useful topics for the consumption of the adult population. In this manner it may be possible to spread health awareness in the Asian Region quickly and efficiently.

29. Language Problems: A large number of unintercommunicable languages and dialects exist in the Asian Region. In India alone there are 14 official languages and over 350 distinctly unintercommunicable dialects. The problems are even more complicated in countries where instructions have to be imparted through various language media simultaneously, as for example in Singapore and Malaysia. In such a situation it may be advisable to provide language learning programmes for the use of students and teachers to enrich possibilities of better communication.

30. Industries; Encouraging results have been obtained in the United Kingdom and India in the areas of industrial and defence training by the use of programmed learning material. Psychomotor programmes involving manual skills may, therefore, be developed for the use of vocational institutions, technical institutions and defence training establishments in the Asian Region. It may be noted that traditional educational institutions may have to take the leadership and major load of work in this area, and it may be necessary to prepare teachers from a pool of teacher educators and planners for this purpose.

31. Science and Mathematics Education: In terms of subject matter the potentialities of the methods of programmed instruction have met with lesser resistance in the areas of Science and Mathematics than in other subject matter areas, although it is generally considered that anything that can be taught can be programmed. Specially amenable for logical analysis, the subjects of scientific and mathematical nature may presently receive priority over other areas. Another advantage of planning emphasis on science and mathematics is the relatively reduced problem of language and medium of instruction. Consequently, in mathematics and science the difficulties of using standard programmes developed elsewhere is less than in other subject areas.

32. Education through Mass Media: Most of the Asian countries have school broadcast systems and television broadcast systems for schools. These benefit from and afford scope for endeavour in programmed instruction. At present the problem of utilizing the Satellite television for school education is being considered by Asian educators. Much of this problem can be approached through use of programmed lessons through mass media. For this purpose a large number of programmed lessons and feedback answer sheets will have to be prepared and tried out. One way of trying it out is through pilot projects involving 8 mm. films, lesson tapes, short circuit television and other advanced audio-visual techniques. The scope is greater in the areas of science and mathematics for collaborative projects developing a series of programmed lessons to be used in each Asian country. Rather than trying it through haphazard individual efforts a series of coordimated programmes for Asian Region may be useful.

33. Computer Assisted Instruction: The scope of computer assisted instruction is not yet very high in Asian countries and, except for Japan, none of the Asian countries has entered into this venture, mainly for lack of funds for the necessary hardware. Encouraging results are, however, being obtained by Japan where this has now been put to use. The development of adequate software, even where the hardware is available, is of the greatest importance, and from this stage attention may be given to train teachers and teacher educators in the possibilities of computer assisted instruction. Development of inexpensive computer systems and teaching machines, therefore, remains a potentially effective but so far unexploited field in the Asian Region.

34. Research: Research data are necessary for examining the relative effectiveness of programmed instruction for various levels of instruction and subject matter. The Asian Region generally lacks the data. Systematic research involving realistic comparisons of conventional methods with programmed instruction are still required. In the Asian Region much of education research has been emphasizing academic and conclusion-oriented approaches rather than applied and decision-oriented approaches in research. The need, however, exists for the latter kind of research in the Asian Region today. This includes, besides the comparison of programmed instruction with conventional methods, the comparison of linear versus branching approach, effects on other personality variables and methods of presentation, including effect on the subject of attention of the students and other variables of the cognitive domain and effect on the existing and ideal patterns of evaluation. Careful designs of research and sampling techniques should be introduced from the very beginning of a large number of research projects in this area.

35. Training: In order to achieve anything in the area of programmed instruction, the training of personnel is of great importance. A strategy for training has been outlined in Section 12 of this report. It suffices to say here that training systems will include appreciation, practitioners'

training and users' training courses. Training may not be approached as a single detail in the development of programmed instruction only. Through the training courses a large number of programmes are likely to be developed and used. This will strengthen the activities listed above. In the first instance a central organization will be necessary to supervise and control the activity of training but later on it may be expected that the Asian countries will take their own initiative for the programme of training.

36. Extension: A mechanism should be developed to provide scope for exchange of information, programmed material and research data mong various Asian countries. Storage and dissemination of information happens to be most urgent for the Asian Region at the present juncture. Additionally, a wide variation exists in the Asian countries with regard to the expertise available in the area. A system of extension work should be developed to exchange the expertise in the Asian Region in order to equalise the availability level. In this context the exchange of trained personnel as well as programmes may be tried out.

37. Collaboration: Collaborative efforts for developing programmes in various subject matter areas may be useful in reducing time for development and also avoiding possible repetitions. For instance, three or four countries may collaborate to develop a series of programmes in the area of modern mathematics, which in turn will be useful for the whole of the Asian Region. They may train their programmers simultaneously and evolve appropriate strategies for these collaborative efforts. For this purpose adaptation projects for standard programmes may be done through a central coordination agency.

CHAPTER IV

THE PROBLEMS OF THE DEVELOPMENT OF PROGRAMMED INSTRUCTION IN THE ASIAN REGION

1. A questionnaire concerning the general problems of development of programmed instruction in the Asian Region, with particular reference to administrative and financial aspects, was drawn up by a sub-committee and submitted to participants. The sub-committee's analysis of the returns suggested that although there was a realistic appreciation of the problems ahead, there was a general anticipation of a sympathetic and helpful framework in which they would be considered. Participants from only three countries expressed concern that their administrators and established teachers might be less than enthusiastic; however, active opposition was not expected. The source of this opposition was generally expected to be financial, although participants from one country considered that the attitude of students and parents might cause initial difficulty. In general terms, it was not considered that initial inertia would be too difficult to overcome.

2. About half of the countries represented provide text books to their primary school pupils free of charge, and considered that there would be little difficulty in incorporating programmed texts within this sort of scheme. Some countries also have similar schemes at Junior and Senior High School level, which could also support the distribution of programmed texts. Of the other countries, five anticipated support from school funds, and four considered it realistic to expect adequate donations from private sources. Three participants considered that adequate support could be expected through Central Government sources, and that this would be their primary source of funds; and two considered that local government would support local endeavour. It would seem that there is a wide range of possible sources of funds; these should be explored and should not be considered to be mutually exclusive.

3. So far as problems of production were concerned, it was anticipated that, in most countries, both government support and cooperation from the private sector, from publishing houses, etc. could realistically be expected. It was generally considered that such innovation might be considered cautiously by some publishers however, and government support in terms of guarantees or contracts might be required.

4. The problem of the availability of specialists in programmed learning is a particularly pressing one. No countries considered they had enough qualified programmers, although there seems to be at least an adequate number of subject matter specialists concerned with curriculum reform, research workers concerned with educational problems and development and editors concerned with the quality of school texts. It may well be that some of these specialists already active in

curriculum development might well widen their interests so that within a short time they could become local experts in programmed learning. Specialists in audio-visual techniques, as well as subject matter specialists might well become specialists in programmed learning particularly rapidly. They would then be able to promote both the training of others and the production and testing of educational materials, and development might well be rapid. The problem of the identification and training of the first generation of such specialists would seem to be a matter of considerable priority, and warrants the earnest attention of all concerned.

5. Consideration was also given to the problems of the utilisation of programmed instruction in the classroom, once the materials have been produced. About half of the countries represented have already made a start in establishing courses for teachers at both elementary and high school level who will be in a position to use programmed learning materials beneficially, selecting them wisely and integrating them with other materials. The general consensus of opinion was that some sort of courses concerning programmed instruction should be introduced into teacher training institutions of every kind, and short conferences and exhibitions, articles in the press, and other media used to have established teachers aware of the possibilities and availability of these materials and methods.

6. Possible areas of implementation were considered in terms of priority and expected effectiveness. Those most commonly mentioned were, in order :

Academic Junior High Schools
Technical Junior High Schools
Elementary Schools
Technical Senior High Schools
Universities

There was a general feeling that initial efforts might well be most fruitfully concentrated on the Junior High School Level. Students have sufficient literacy skills, and adequate concentration to cope with these materials. Student numbers at this level
to elementary level than High School numbers might be; and the curriculum at this level is already under review in most of the countries concerned.

8. The curriculum of junior high schools includes mathematics, science and language arts, and these have heavy emphasis. Vo ational subjects, social studies and aesthetics are also important, but there is likely to be wider difference in the subject matter content of these subjects and a stronger cultural dependance. In view of the importance for technological development of such subjects as mathematics and science, and the need for the international languages most generally used for access to them and discussion, the initial concentration of effort on these subjects and a junior high school level was considered to be realistic and appropriate, and was generally recommended.

CHAPTER V

GUIDANCE FOR FUTURE ACTION

Section One: Strategies of Introducing Programmed Instruction

1. Programmed Instruction is an innovation technique for promoting learning and, broadly speaking, all the various methods which have been found effective in introducing other types of social and technological change and innovation may be found useful in this area as well. More specifically the experiences of the participants shows that (a) integration of this innovation with the total educational system; (b) financial support; (c) administrative leadership; (d) readiness of the teachers and students for CHANGE; (e) existence of related facilities; (f) availability of expertise; and (g) exposure of the clientele to the innovation and their training in it, are some of the important factors that may determine the success of the efforts at introducing the desired innovation. The framework of a strategy for introducing Programmed Instruction in the Asian region must, therefore, be built around a number of the above mentioned factors, among others.

2. Accordingly, it is suggested that efforts be made to convince the policy makers, teacher educators, and teachers of the importance of programmed instruction as part of a broader movement of educational innovation.

3. In order to obtain the commitment of all concerned, it is suggested that (a) Conference and Seminars on the need and uses of programmed instruction be held in the various countries; (b) courses in programmed instruction be introduced in the teacher training institutions; (c) mass media be used to expose the clientele and the public at large to the nature and usefulness of programmed instruction, by contributing articles to the newspapers, giving talks on radio and presenting programmes on television; and (d) particularly in the case of the policy makers, individual contacts be made with people of higher planning category in education and finance and other senior officers.

4. Every nation has its priorities on the level of urgency of its needs such as adult education, functional literacy, occupational training, universal primary education, modernization of curricula, and overall improvement of quality of education, among others. A useful strategy for initiating and accelerating the use of Programmed Instruction would be to integrate the technique with the national priorities.

5. Whereas steps should be taken to activate the global strategy mentioned above, each participant of the present workshop should play a significant role in introducing Programmed Instruction in his country be setting a personal example of commitment to the cause such as arranging the preparation of Programmed Instruction materials, writing articles for publicity, and arranging radio and television programmes.

6. Some countries of the region are already engaged in producing and utilizing Programmed Instruction materials and it is hoped that the other countries will have some progress in introducing Programmed Instruction during the Asian Project period. The next goal will be to broaden the scale of operations so that the benefits of Programmed Instruction can reach the largest number of learners at all levels and types of education and training. The attainment of this goal will depend to a large measure on the level of commitment of the national governments and Unesco. The roles both these agencies should play have been discussed in the later section of the present chapter. However, it is appropriate to suggest a few guide lines in this report at the present stage.

7. The role of mass media in introducing the idea of Programmed Instruction has already been mentioned. It may be pointed out here that the tempo of utilization of mass media for projecting the need and uses of Programmed Instruction should be increased effectively. Attempts should be made to enlist the support of newspaper editors as well as the authorities concerned with the production of educational programmes on radio and television.

8. Almost all countries of the region have some influential professional organizations of teachers and administrators. The participants and national Governments should make attempts at enlisting their support for Programmed Instruction.

9. The private entrepreneur is perhaps the easiest to persuade to adopt new ideas and techniques. The publishers of textbooks and other educational materials may prove to be the best supporters of the innovation provided they are convinced that Programmed Instruction has a potentially profitable market. They will then bring into the field their own forces in popularizing the programmed materials. It is, therefore, suggested that the interest of the publishers be aroused in Programmed Instruction techniques.

10. Programmed Instruction is only one of the techniques for achieving the objectives of education. For its effective utilization it is important to promote it in relation to the total perspective of the educational system of a country. It is, therefore, advisable to coordinate and integrate it with the "national plans" for reformulating objectives of education, revision of curricula and reform of educational methodology.

Section Two : Training of Producers and Users of Programmed Instruction.

11. Training of a large number of personnel, programme producers as well as users will go a long way in accelerating the pace of development of Programmed Instruction. Specific recommendations regarding the training of such personnel are presented below.

12. If the innovators are sincere, they will wish to put into practice the principles they teach. They would first specify the tasks to be performed by teachers, and suggest that these be distinguished as either producers or users. If programmed instruction is to be efficient, there will be a relatively small number of people requiring rigorous training as producers, and a much number of people who will wish to use the materials to their best effect.

13. It will be necessary to involve experienced practising teachers in these techniques, in case of any difficulty of arranging long term secondment of servicing teachers, it will be necessary to concentrate on inservice training courses in the main. The courses that already exist should be examined, and those which could properly include a programmed instruction element identified. The need for further courses will then be clarified, and a division made according to the level of involvement of the course graduates with programmed instruction.

14. The basic learning materials are usually referred to as software, and the presentation devices as hardware; training for these can be considered separately, although in practice there will be a need to consider the interaction of message and medium.

15. There is an obvious link between the hardware of programmed instruction and audio-visual aids in general, and courses in these machines could part of the background of a competent programmer, for, as programmed instruction is interpreted today, a range of media are available to the programmer, and familiarity with the characteristics of different machines and their potential is necessary. Operational and maintenance skills both need to be studied for the programmer to be able to assess the demands that he will make on the teacher. It is reported that useful courses are sometimes organizad by manufacturers in some countries. However an integrated study of a range of media can be more profitable, so that adequate comparisons may be made and a more comprehensive view obtained. In courses offered by one manufacturer this is not always possible.

16 The software element, consisting as it does of the actual course content, has to be considered within the whole field of curriculum development. Inclusion of a programmed instruction element within existing courses in this field would be to their mutual benefit. Where training is to be given to people from a wide range of disciplines this will not be possible, and separate courses on the basic principles of the preparation of materials will have to be arranged. Opportunity will have to be provided for individual members of such a course to become acquainted with curriculum developments in the subject areas they wish to programme if the materials produced are to be acceptable as innovation.

17. At an elementary level it would be possible to consider the teacher to have sufficient scholarship to be considered as a subject matter specialist as well as a potential programme writer after adequate training. At the secondary and higher levels of Education, he will need access to acknowledged specialists as well as acceptable curriculum materials. In the production of materials that will follow from these

courses, it will be necessary to establish teams of people with a range of competencies, and also involvement. One subject specialist and one evaluation expert can advise a number of programmes writers working in a similar field. An individual will be most successful in writing programmed materials in his own subject, particularly if he has taught it, and competence in the content matter will have to be ascertained. Sufficient familiarity with the techniques of evaluation will have to be considered within the course. For programmes to be constructed for more advanced levels the various components of programmed instruction may need to be considered as specialisms, and evaluation, for example, be prepared by an evaluation expert familiar with programmed instruction rather than the reverse.

18. The group of people who 'use' programmed materials can be interpreted widely to include educational decision makers as well as classroom teachers. Courses will be required which will foster an appreciation of programmed instruction at all levels. These courses should take advantage of the increasing awareness among administrators of the need to use manpower, and resources, in the educational enterprise to the full. They can indicate the role of programmed instruction and related techniques in this field. There may well be existing courses in this area which may profitably have a programmed instruction element attached. Administrators have been able to consider the whole range of resources, and the planning of educational systems in specific terms for some time. The preliminary techniques of analysis of course content and construction of behaviorial objectives will be found to be relevant to these areas. Simulation exercises can be conducted as this level, and, if successfully done, courses should affect the attitudes of administrators in such a way that those involved in the production and use of materials will do so within a sympathetic, knowledgeable framework.

19. Whereas the number of teachers actually involved in the preparation of materails may, for a number of reasons, be quite small, it will be a constant aim to have the number of teachers able and willing to une programmed instruction materials as large as possible. It is not envisaged that special courses in the use of programmed instruction should be set up, but some exposure to the processes and products of the approach should become part of the training of every teacher. For example, exhibitions and one day meetings can be organized for teachers who wish to have knowledge of these materials but have no wish to specialize in the area.

20. The programmed instruction movement, the development of visual-aids, the developments in testing techniques and all the other components of the new educational technology have taken place at a time of changing emphases in education. These have been on quality of learning, and teaching for understanding, and the general opinion has been that this is most likely to be achieved where the learner himself is active. These new ideas involve a rethinking of the teacher's task. It would be tragic if teachers were to consider these new techniques as a dangerous challenge to their security. They need to be helped to see the full potential of the teacher's role, so that, as far as the arrangement of learning conditions is concerned, every teacher will eventually have the time, opportunity and competence to consider himself as a planner of educational systems rather than as a sole purveyor of knowledge.

21. Innovation will be most likely to succeed where there is a heavy involvement of serving teachers. If we are to ask teachers to add voluntarily to the demands already made upon them to take full advantage of the new techniques, and also where they have been able to acquire new skills through their own initiative, every effort should be made to encourage them to make their tasks easier. There will be a need forabstracting services to keep busy teachers up to date with the latest developments. Multi-media subject catalogues will have to be developed, so that materials that already exist on one topic for a range of media can be identified through one source.

Section Three : Priority Subject Areas

22. (a) For the purposes of producing self-ware materials, the following subject areas should be given preference. In order of priority they are:

(1) Mathematics

(2) Sciences (Physical and Natural)

(3) Languages (both National and Foreign)

(4) Social Studies

(5) Functional Literacy/Adult Education (in the context of extension work in Agriculture, Population Dynamics, Health Education and the like).

(b) In the initial stages of the production of programmed instructional materials, the following levels/aspects of education should be given the following order of priority:

(1) Secondary Education

(2) Teacher Education

(3) Primary Education

(4) Higher Education

(c) Curriculum construction and the national textbook policy must be closed integrated with programmed learning.

Section Four : Software and Hardware

23. High priority should be given to the production of software in different subjects of immediate need. Auto-instructional software programmes need to be developed in the beginning and reliance on machines should not be contemplated until a genuine need is felt at the national level.

24. When machine presentation is being introduced, care should be exercised to ensure that machines are obtained which will be flexible, and which will not prescribe programme styles in a rigid manner, at this precludes development of software techniques.

Section Five : Production of Materials

25. In order to produce, adapt and translate programmed instructional materials, the following two arrangements are strongly recommended:

(a) Each nation should establish a National Programmed Instruction Unit to coordinate the production, adaptation and translation of programmes, and to serve as a clearing house at the national level. These Units should enlist the services of programmers in order to produce programmes for various areas of national priority.

(b) An Asian Centre for Educational Technology funded by UNESCO be established at a convenient place in Asia. The Centre may be given the following functions:

(i) To serve as a clearing house of information and materials as a Documentation Centre. It would engage in listing, procuring and cataloguing all available materials on programmed instruction and allied fields such as curriculum development, audio-visual aids and instructional technology.

(ii) To produce and adapt instructional materials indifferent subject areas for various levels of education in Asia. Cooperative production of materials may also be taken up by this Centre.

(iii) To translate important material written in national languages to English in order to give it wider circulation throughout the Asian region.

(iv) To serve as a liaison agency on instructional materials between Unesco Headquarters, Paris and member countries in Asia.

(v) To sponsor training programmrs, Conferences, Workshops and Seminars on programmed instruction for educators of Asia.

Section Six : Research in Programmed Instructions

26. Research in Programmed Instruction should be undertaken as soon as possible and the following areas should be assigned priority-

(a) Effectiveness of Programmed Instruction as compared to conventional methods of teaching.

(b) Effect of teacher attitude on Programmed Instruction

(c) Sample studies of comparison between

(i) individual and group education through programmed learning, and

(ii) linear and branching styles of Programmed Instruction.

(d) Experimental research on theories of learning (implict in Programmed Instruction such as reinforcement, span of attention, personality types, memory, factors of learning, motivation and retention.

(e) Effectiveness of audio-visual aids especially educational television, school radio broadcasts, films, filmstrips, loops and slides as tools of instruction and their efficient integration with Programmed Instruction.

(f) Utilisation of Programmed Instruction materials as home assignments for regular students as well as for those who are studying through correspondence courses or in the capacity of private students,

(g) Since facilities for promoting institutionalised research in Asia are scarce, it is suggested that wherever facilities are available students working for Master's and Doctoral degrees in Education be encouraged to take up vital areas of Programmed Instruction as topics for their theses and dissertations.

Section Seven : Dissemination and Exchange of Information and Materials among Asian Nations

27. A Newsletter should be published for dissemination and exchanging information effectively.

a) The Newsletter should have an Editor and possibly an Assistant Editor.

b) For the sake of convenience, it is suggested that both Editor and Assistant Editor be chosen from the same country or from neighbouring countries.

c) It is suggested that UNESCO provide full financial assistance for this scheme.

d) The Newsletter should contain the following sections:

i) Information about the latest developments in the fiels of Programmed Instruction both worldwide as well as in the region including the latest research carried out in this field.

ii) A catalogue as well as review of Programmes available or as they become available.

iii) A letterbox which will be a platform for the exchange of views, constructive criticism, assistance and guidance. It is envisaged that participants would like to correspond with each other in this manner.

iv) Special feature articles.

Section Eight : National Organizations for Programmed Instruction

28. There are two categories of national organizations for programmed instruction: government organizations and private organizations. The following organizations may exist already; if not it is suggested that they be established in order to promote Programmed Instruction in the country.

29. (a) An appropriate agency of the Government should collect and translate documents concerning Programmed Instruction, programmed textbooks and teaching machines. Moreover, it should draw up plans for introducing Programmed Instruction in schools.

(b) A center for Instructional Materials should produce programmed textbooks and teaching machines, and other programmed materials.

(c) A center for Educational Technology should publish books concerning programmed instruction and teaching machines, so that all concerned will be informed about the new educational method.

(d) Teacher training institutions may be encouraged by Government organizations to introduce Programmed Instruction as an element in their curriculum.

30. (a) Private schools associations should form committees for educational innovation. The committees will conduct research for the application of Programmed Instruction in private schools.

(b) Industrial organizations and associations should apply Programmed Instruction in training their own employees and form committees for research and production of programmed materials. Such tasks will be necessary for the industrial development of the country, and useful for educational innovation in general.

(c) Teachers' associations should disseminate knowledge and experience on Programmed Instruction.

Section Nine : The Role of National Governments

31. Considering the fact in some countries in the region the direction, control and supervision of education is almost entirely in the hands of the state, it is recommended that the initiative for introducing Programmed Instruction should come essentially from the national governments of such countries.

32. Considering the fact that in most countries educational planning and development of the curriculum is handled by a central agency, it is recommended that such agency should endeavour to link Programmed Instruction with curricular reconstruction by :

(a) Involving experts from teacher training institutions such as programmers, test constructors, audio-visual specialists, subject specialists and curriculum designers in close collaborative work;

(b) involving industrial and business firms in this programme in order to generate national interest.

33. Considering the fact that in some countries private agencies play a significant role in the provision of education, it is recommended that the national governments of such countries should supply information, advice guidance and financial assistance wherever possible to such agencies to introduce Programmed Instruction.

34. Considering the fact that in some countries of the region one of major obstacles to socio-economic development in the high rate of illiteracy and in view of the fact that Programmed Instruction is an effective technique for the promotion of literacy, it is recommended that national governments should muster all resources in adopting the techniques of Programmed Instruction in improving the rate of literacy at all levels in the community.

35. Considering that high priority is given to the teaching of languages, mathematics and science in all developing countries in the region, it is recommended that national governments should arrange for collaboration between writers of textbooks and curriculum designers in order to introduce Programmed Instruction in these subject areas whenever it can be done.

36. Considering the fact that the quality of instruction and the standard of education will depend on the professional competence of the teachers and the classroom techniques they adopt, it is recommended that :

(a) a concerted attempts should be made to disseminate information on Programmed Instruction to teacher through seminars, study circles and regular in-service training programmes;

(b) encourage personal contact through correspondence between teachers and educators of other countries working in the field of Programmed Instruction.

Section Ten : The Role of Unesco

37. The initiative taken by Unesco in introducing the idea of Programmed Instruction in Asia on the regional scale by organizing the "Experimental Project", of which the present Workshop represents the first phase, is highly commendable. The countries which have already started work on Programmed Instruction received reassurance and encouragement while those yet to start received inspiration and hope. Unesco, however, has incurred heavy responsibilities by creating this enthusiasm which must be translated into useful and dynamic action. Accordingly, Unesco should exercise further leadership by adopting the recommendations outlined below.

38. The most urgent need of many developing countries in the region for starting and continuing the Programmed Instruction project is that of expertise. As expert Programmed Instruction technologists are very scarce within the countries concerned, Unesco should make such services available to the countries that need them by (a) sending experts for short terms; (b) stationing one expert for about six months; and (c) providing the services of experts by answering queries through correspondence.

39. Many advanced countries of the world and some nations of the Asian region have, for several years now, been producing and experimenting with Programmed Instruction materials. Most Asian countries, however, do not have easy access to such materials on account of several well known reasons. It will help the cause of Programmed Instruction in the Asian region a great deal if Unesco arranges (a) to supply to them software already available in the English language; (b) to arrange for the translation and distribution of good programmers; and (c) to equip at least one demonstration laboratory with essential hardware.

40. Although it has been recommended above (para. 38) that Unesco provide the services of experts to the countries in need of such services, the programmed instruction project in any country can become a viable proposition only if the nation has a corps of its own experts. In view of this, it is suggested that Unesco should provide training for experts in various subjects by organizing a three month Programmed Instruction course either at a central place or within the respective countries. These experts will then train more experts within their own countries thus increasing the number of experts through multiplier effect.

41. Since the present Project on Programmed Instruction has been conceived as a regional project involving most of the Asian countries and as it will be very useful for these countries to cooperate amongst themselves and to make concerted efforts for the development of Programmed Instruction on the regional level as well as severally, it is important that a forum be organized to coordinate the efforts. It is, therefore, suggested that (a) an organization to be known as the Association for the Advancement of Educational Technology in Asia (AAPIA) be created with the participants of the Workshop as founding members; (b) the Association should have an Executive Committee; (c) the Association should meet at least once every two years and the Executive Committee once every six months; and (d) Unesco be the sponsor of the Association.

42. First hand knowledge of the work being done by the various nations of the region could be a most stimulating and enriching experience for the participants. As it will not be possible for the participants to visit other countries on their own and also as many national governments cannot spare foreign exchange easily, it is suggested that if feasible, Unesco should arrange for mobile exhibitions and short term visits of the participants to the various countries if so desired.

43. Individual and voluntary efforts notwithstanding, the role of the national governments in the introduction and development of any type of innovation cannot be denied. Unesco should, therefore, make every effort to convince the national governments regarding the importance of Programmed Instruction for the improvement and development of education

in their countries. Unesco experts could visit the countries involved and hold meetings with top policy makers and administrators to convince then of the efficacy of Programmed Instruction.

Section Eleven : Plan of Future Activities

44. It is recommended that a Committee of consultative nature be constituted immediately to advise Unesco in planning and organizing the future activities of the Experimental Project. The Committee shall hold its first meeting in September 1970 to be followed by other meetings at six month intervals.

45. The participants indicated that following priorities for their respective countries in terms of developing Programmed Instruction in various subject matter areas and educational programmes:

	I Modern Maths.	II English	III Modern Science	IV Social Studies	V
Ceylon	OK(1)	OK(3)	OK(2)		
China	OK(1)	OK(3)	OK(2)		
India	OK(1)	OK(2)	OK(3)	Geography and health education home management defence (5)	Indian Languages (4)
Indonesia	OK(2)	OK(3)	OK(1)		
Japan	OK(1)	-	OK(2)		
Korea	OK(1)	-	OK(2)		
Malaysia	OK(2)	-	OK(1)		
Pakistan	OK(3)	-	OK(2)		Functional literacy Occupational trainings(1)
Philippines	OK(2)	-	OK(1)		
Singapore	OK(2)	OK(3)	OK(1)		Technical subjects (4) e.g. basic electricity, electronics, etc.
Thailand	OK	-	-		
Vietnam	OK (1)	OK(2)	-		

In view of the above, Cooperative Programmes may be developed by grouping interested countries around the areas of their common interests. A sample arrangement is suggested below :

(a) Production in English of programmed materials in modern mathematics by respective national groups (by February 1971)

Miss Hawkins may be available to assist the national groups during the course of preparation.

(b) Meetings of the programmers and the organizers in early March 1971 for 5 days in Tokyo.

(c) Reproduction and dissemination of the programmed materials as well as the report of the meetings to the participating countries to be presented in the March meeting.

46. The following training programmes may be instituted during the period 1970-72:

(a) National Training Courses in Programmed Instruction in subject areas of national priority may be organized by the national authorities from 1970. Sub-regional Training Courses may also be organized from 1970 if so desired by the participating countries. The services of the Unesco Consultant may be made available for advice and guidance in instituting and conducting such training courses.

(b) Regional Training Courses may be organized for trainers of programmers in 1970.

(c) Mobile teams of Experts may be organized by Unesco and the Japanese National Commission for Unesco to hold training Courses in member countries during 1971-72. Sampleshardwares would also be made available to the teams for demonstration purposes.

(d) Training should be approached as a method for developing programmed material as well as creating basic task forces for future activities in the area of Programmed Instruction. For this purpose, three levels of activities are envisaged under training.

1. Appreciation conferences for decision makers.
2. Intensive training courses for trainers of programmers.
3. Short term workshops for teachers.

Time Schedule

It is estimated that during 1970 the first two of the above-mentioned activities may be taken up and the third may be taken up during 1971-72.

Appreciation Conferences

These conferences are envisaged to be of 2 days' duration. Top level decision makers may be involved in these conferences wherein useful

facts regarding possibilities of Programmed Instruction for education will be presented through filmshows, research data showing advantages of Programmed Instruction and exhibitions of programmed material. About 20 participants should be involved in each country.

Intensive Training Courses

These courses are estimated for a duration of 6 weeks with an objective of training programmers who will in turn conduct training courses in their respective countries. There might be 30 participants from all over Asia. The expenses may be supported partly by the national Governments and partly by Unesco.

Short-term Courses

The trainees of the above course conduct short term courses vary for 15-30 days involving school teachers. At the first instance the courses will need material and expertise from Unesco. These courses may have subject matter emphasis e.g. Mathematics, Science etc.

In addition to the above courses, sub-regional collaboration for training programmes may be encouraged by taking advantage of existing national training programmes in neighbouring countries and organizations like the INNOTECH.

A mobile team of experts might assist execution of such training programmes. The team may be equipped with all necessary references, aids and hardwares for this purpose.

47. Unesco is invited to draw up plans for organizing the activities of the Experimental Project, such as (a) documentation, (b) dissemination, (c) publication of Newsletter, (d) training in Programmed Instruction, and (e) arrangement of a Programmed Instruction Caravan. Possibilities should also be explored to coordinate the activities of the Experimental Project with other existing national and international Projects of similar nature in the Asian Region.

48. Unesco may contact INNOTECH, RECSAM and RELC to work out Unesco-SEAMEO joint projects on educational technology, programmed instruction in science, mathematics and English language.

The possibility may be explored for the participation of non-SEAMEO countries.

49. Evaluation to meeting of the Experimental Project may be held late in 1971 or in the beginning of 1972.

Chapter VI

Annexes

1. Time Schedule of Workshop Activities

12 February (Thursday)	
10.00 - 11.00	Opening ceremony
11.15 - 12.30	Lecture : New trends in educational technology, by Miss Hawkins, Unesco Consultant.
14.00 - 17.00	Report and discussion : National report by participants on programmed instruction in their respective countries.
13 February (Friday)	
10.00 - 12.30	Report and discussion : National report (continued).
14.00 - 14.30	Showing of VTR
14.30 - 17.00	Lecture and discussion : Historical development of programmed instruction and educational technology, by Prof. Seigo Tanaka, Professor, Osaka University.
14 February (Saturday)	
10.00 - 10.30	Study work on principles of programmed instruction by using response analyser.
10.30 - 12.30	Lecture and discussion : Pedagogical principles and psychological basis of programmed instruction, by Dr. Hiroshi Azuma, Associate Professor, University of Tokyo.
16 February (Monday)	
10.00 - 10.30	Study work on physics by using programmes.
10.30 - 12.30	Lecture : Stages in the preparation of a programme by Dr. Terumi Nakano, Associate Professor, International Christian University.
14.00 - 17.00	Lecture : Analysis of objectives (techniques of linear type programming), by Prof. Ichio Numano, Toho University.

17 February (Tuesday)

10.00 - 10.30 Study work on mathematics by using programmes

10.30 - 12.30 Lecture : Planning of sequence, by Prof. Kazuo Numano Toho University.

14.00 - 17.00 Practice : Choice of subject matter, specification of target population, specification of objectives, analysis of subject matter, and planning of sequence, by Prof. Ichio Numano, Toho University.

18 February (Wednesday)

10.00 - 10.30 Study work on mathematics by using teaching machines and programmed sheets.

10.30 - 12.30 Lecture : Techniques of branching type programming including computer-assisted instruction programming, by Prof. Toshio Horiuchi, Tokyo Gakugei University.

14.00 - 17.00 Lecture and discussion ; Construction of pre and post-tests and evaluation of programmed instruction, by Prof. Toshio Horiuchi, Tokyo Gakugei University.

19 February (Thursday) Travel to Osaka

20 February (Friday)

10.00 - 12.30 Lecture and discussion : Administration of try-out and data analysis (linear type), by Prof. Seigo Tanaka, Osaka University.

14.00 - 17.00 Lecture and discussion : Administration of try-out and data analysis (branching type) by Prof. Seigo Tanaka, Osaka University.

21 February (Saturday)

10.00 - 12.30 Lecture and discussion : Use of language laboratory and programming of software in "English language" teaching by Dr. Mitoji Nishimoto, President, Tezukayama Gakuin University, and other staff members of the Tezukayama Gakuin University (at Tezukayama Gakuin University).

23 February (Monday)

10.00 - 12.30 Practice : Frame writing

14.00 - 17.00 ditto

24 February (Tuesday)

10.00 - 12.30	Practice : Frame writing (continued)
14.00 - 17.00	ditto

25 February (Wednesday)

10.00 - 12.30	Discussion on programmed materials prepared by the participants.
14.00 - 17.00	ditto

On 23 and 24 February, the participants are divided into three groups, i.e. mathematics, science and English, and practice is carried out in respective groups. Advisers for practice are as follows :

Mathematics :

Mr. Ryuichi Maeda, Chairman, Board of Directors, Osaka Shoseki Co. Ltd.
Mr. Aiwa Akagi, Research worker, Osaka Science Education Centre
Mr. Osamaru Nakatake, Research worker, Osaka Science Education Centre
Mr. Keiichi Hirata, Lecturer, Tezukayama Gakuin University

Science :

Miss Hawkins, Unesco consultant
Mr. Haruo Nishinosono, Associate Professor, Kyoto University of Education
Mr. Jiro Watanabe, Teacher-Consultant, Hyogo Prefectural Board of Education

English

Dr. Mitsoji Nishimoto, President, Tezukayama Gakuin University
Mr. Tatsuyo Hori, Lecturer, Tezukayama Gakuin University
Mr. Tomio Kawakami, Lecturer, Tezuyakama Gakuin University
Miss Noriko Minekawa, Assistant, Tezuyakama Gakuin University.

26 February (Thursday)

Visit to the Uemachi Lower Secondary School and the Kozu Lower Secondary School in Osaka

27 February (Friday)

10.00 - 12.30	Demonstration and discussion : Programmed instruction and audio-visual techniques of instructional equipments, by Prof. Seigo Tanaka, Osaka University.
14.00 - 17.00	Ditto.

28 February (Saturday)

Visit to the Hyogo Prefectural Hyogo Technical Upper Secondary School in Kobe.

2 March (Monday)

Sightseeing in Kyoto.

3 March (Tuesday)

10.00 - 12.30 Lecture and discussion : Curriculum reform and programmed instruction, by Miss Hawkins.

14.00 - 17.00 Ditto.

4 March (Wednesday)

10.00 - 12.30 Lecture and discussion : Organization for production and dissemination of programmed instruction materials, by Miss Hawkins.

14.00 - 17.00 Discussion : Report of participants on impression of school visits.

5 March (Thursday)

Travel to Tokyo.

6 March (Friday)

Visit to the Centre for Ability Development Engineering and the Matsushita Communication Industry Co. Ltd.

7 March (Saturday)

10.00 - 10.30 Showing of VTR.

10.30 - 12.30 Lecture and discussion : Computer-assisted instruction, by Prof. Shigeru Watanabe, University of Tokyo.

9 March (Monday)

10.00 - 12.30 Lecture and discussion : The rôle of teachers in programmed instruction, by Mr. Takashi Sakamoto, Associate Professor, Tokyo Institute of Technology.

14.00 - 17.00 Visit to the NHK Broadcasting Centre.

10 March (Tuesday)

10.00 - 10.30 Showing of VTR

10.30 - 12.30 Lecture and discussion : Socio-economic basis of programmed instruction and educational technology, by Mr. Takashi Sakamoto, Associate Professor, Tokyo Institute of Technology.

14.00 - 17.00 Visit to the Nippon Electric Co. Ltd.

11 March (Wednesday)	
10.00 - 10.30	Showing of VTR.
10.30 - 12.30	Lecture and discussion : Administrative and financial aspects of programmed instruction and educational technology, by Mr. Hideo Ohashi, Inspector, Elementary and Secondary Education Bureau, Ministry of Education.
12 March (Thursday)	
10.00 - 12.30	Report and discussion : Problems in development of programmed instruction in Asian countries.
14.00 - 17.00	Ditto
13 March (Friday)	
10.00 - 12.30	Discussion : Future development of programmed instruction in Asian countries.
14.00 - 17.00	Ditto.
14 March (Saturday)	
10.00 - 12.00	Examination and adoption of the recommendations of the Workshop.
12.00 - 12.30	Closing ceremony.

2. Directing Staff

Workshop Director : Prof. Seigo Tanaka, Osaka University
Deputy-workshop director : Prof. Toshio Horiuchi, Tokyo, Gakugei University.
Unesco consultant : Miss Anne Hawkins
Secretariat : Mr. Ryoji Ito, Secretary-General, Japanese National Commission for Unesco.

3. Steering Committee

Prof. Seigo Tanaka, Workshop Director
Prof. Ishwarbhai J. Patel, India
Dr. Zulfiqar Ahmad, Pakistan
Miss Anne Hawkins, Unesco Consultant
Mr. Henri Dieuzeide, Director, Division of Methods, Materials and Techniques, Unesco
Mr. Ryoji Ito, Secretary-General, Japanese National Commission for Unesco.

4. Working Sub-Committees

Group I : Social Studies Group on Population

Dr. Winarno Surachimad, Indonesia
Dr. R.A. Santoso, Indonesia
Miss Bernadette Koay, Malaysia
Dr. Shaukat Ali Siddiqi, Pakistan

Group II : Language Group on Plural of Nouns

Dr. Julian B. Yballe, Philippines
Mr. Au Keng Chu, Singapore
Mr. Oliver Seet, Singapore
Prof. Pham Van Thuat, Republic of Viet Nam.

Group III - Mathematics Group on the Law of Exponents

Mr. Sugunadasa Atukorala, Ceylon
Prof. Ishwarbhai J. Patel, India
Mr. Atsushi Yamada, Japan
Mrs. Lilia V.Juele, Philippines
Mr. Karnchit Attagara, Thailand
Mr. Tran Huu Danh, Republic of Viet Nam

Group IV : Science Group
Mr. Tung-Sheng-Fang, Republic of China
Mr. Hideo Mizumura, Japan
Dr. Zulfiqar Ahmad, Pakistan
Mr. Charoon Vongsayanha, Thailand

Group V : Language Group
Mr. U.D.I. Sirisena, Ceylon
Prof. Pao-tien Tsai, Republic of China
Prof. C.H.K. Misra, India

5. List of Participants

CEYLON	Mr. U.D.I. SIRISENA, Director of Education (Secondary Education) Ministry of Education and Cultural Affairs, Malay Street Colombo 2
	Mr. Sugunadasa ATUKORALE Principal, Nalanda College, Colombo 10
CHINA, REPUBLIC OF	Professor Pao-tien TSAI Director of Social Sciences Materials Center National Chengchi University, Taipei, Taiwan
	Professor Tung-sheng FANG, Director, Audio-visual Education Institute Chueh Sheng Memorial Library, and Educational Media Science Institute, Tamkang College of Arts and Science King-hwa Street, Taipei, Taiwan
INDIA	Professor Ishwarbhai J. PATEL, Vice-Chancellor, Sardar Patel University Vallabh Vidyanagar, Gujarat
	Dr. C.H.K. MISRA Reader in Psychology National Institute of Education, N.I.E. Campus Sri Aurobindo Marg, New Delhi-16
INDONESIA	Dr. Winarno SURACHMAD, Director of the National Assessment of Education Project, Ministry of Education and Culture, and Professor, Educational Psychology and Research Methodology, IKIP Office : Dj. Serang 9, Djakarta.
	Dr. RA.A. SANTOSO Professor, Audio-Visual and Mass Education Bandung Institute of Education, and Member, Office of Education Planning and Development Ministry of Education and Culture Dj. Serang 9, Djakarta

JAPAN	Mr. Hideo MIZUMURA Research Worker Saitama Prefectural Education Centre Urawa City Saitama Prefecture
	Mr. Atsushi YAMADA Research Worker, Mie Prefectural Institute of Education, Tsu City Mie Prefecture
KOREA, REPUBLIC OF	Mr. Yeongtag LEE Curriculum and Textbook Co-ordinator, Ministry of Education Seoul,
MALAYSIA	Miss Bernadette KOAY Gaik Kooi, Examinations Specialist, Examinations Syndicate, Jalan Suleiman Kuala Lumpur
	Mr. WAN Abdul Aziz bin Wan Hamzah Ministry of Education Federal House Kuala Lumpur
PAKISTAN	Dr. Zulfiqar AHMAD, Heald, Department of Research, Institute of Education and Research University of the Panjab Lahore
	Dr. Shaukat Ali SIDDIQI Specialist (Audio-visual aids), Central Bureau of Education, Ministry of Education and Scientific Research, Islamabad
PHILIPPINES	Mr. Julian B. YBALLE, Assistant-Director Bureau of Private Schools Department of Education Manila

Mrs. Lilia V. JUELE
Teacher Education Specialist
Bureau of Public Schools
Department of Education
Manila

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Kay Siang Road,
Singapore 10

Mr. Oliver SEET
Lecturer
English Studies Department
Teachers' Training College
Paterson Road
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THAILAND

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Department of Educational Techniques,
Ministry of Education
Bangkok

Mr. Karnchit ATTAGARA
Audio-Visual Center,
College of Education
Prasarnmitr,
Bangkok

VIET NAM, REPUBLIC OF

Mr. PHAM van Thuat
Secretary-General
Vietnamese National Commission for Unesco,
and Professor at the Faculty of Pedagogy
University of Saigon
Saigon

Mr. TRAN Huu Danh
Programme Specialist
Instructional Materials Center,
240 Tran Binh Trong Street
Saigon

OBSERVER	Mr. Ly Chanh DUC Project Co-ordinator, SEAMEO Regional Center for Educational Innovation and Technology, c/o SEAMES, Bangkok Thailand
	Mr. Frederic John Canty ASHTON, Unesco Chief Technical Adviser, Ipoh Polytechnic Ipoh Malaysia
UNESCO Representative of Director General	Mr. Henri DIEUZEIDE Director Division of Methods, Materials and Techniques, Department of School and Higher Education Unesco, Paris
Consultant	Miss Anne HAWKINS Head of the Science Department West Midlands College of Education, Walsall, Staffordshire England

6. Evaluation of the Workshop

1. A questionnaire was prepared and submitted to participants; frequency tables were c·nstructed from their replies and the following conclusions were drawn.

2. Most of the participants appreciated the choice of venues, Tokyo and Osaka, considering them "most appropriate" or "appropriate" in equal numbers; very few declined to comment.

3. The participants perceived themselves as administrators and coordinatros, rather than as programmers and trainers of programmers, in the next phase of the project. This salutory response is in accord with the expressed aim of the workshop, "to prepare highly qualified teachers and high ranking administrators to play a key role in the development of programmed instruction in their own countries". Almost all the participants considered that the workshop had given them sufficient guidance for their envisaged role; some said they had been extremely well prepared and a very few felt they had received no benefit at all. All the participants expressing such an extreme view, in either direction, planned to administer or coordinate effort on their return.

4. The participants were asked to evaluate the activities of the workshop with reference to their relevance to the particular activities indicated previously. There was little correspondence between stipulated role and choice of activities; the following were generally considered most useful for further work.

1. New trends in educational technology
2. Stages in the preparation of a programme
3. Visit to Hyogu Technical Upper Secondary School
4. Visit to the Language Laboratories, Tezukayama Gakuin University
5. Visit to Uemachi and Kozu Lower Secondary Schools

The activities considered to be least helpful were :

26. Use of language laboratory and programming of soft ware
    Administrative, financial aspects of p.i. and e.t.
    Visit to Tokyo Shibaura Electric Co. Ltd.
    Reading disctributed programmed texts
    Test construction

31. Administration of tryout data (branching)
32. Visit to Nippon Electric Co. Ltd
33. Visit to Matsushita Communication Industry Co. Ltd
34. Socio economic basis of p.i. and e.t.

The majority of the participants considered the duration of the workshop to be appropriate; although five felt that it could have been shorter , but no-one indicate that it should have been longer.

5. The workshop was organized with the following objectives in mind.

(a) to consider the adaptation of programmed instruction techniques to the specific educational need of developing countries in Asia;

(b) to examine the inter-relation of curriculum reform and educational techniques

(c) to plan production (including translation) of programmed materials as well as planning utilization at school level

(d) to compare types of existing organisation for production and dissemination of programmed instruction.

In each case average scores fell between "just achieved" and "well achieved", although most participants considered that objective (a) was the best achieved of the four, and objective (b) the least. Consequently the evaluation committee feels that in following workshops the relationship between educational technology and the related areas of curriculum development should receive heavier emphasis. It is likely that this may lead to a more realistic approach towards programmed instruction, thereby increasing its potentiality for the region.

6. When considered in relation to the duration of the workshop of 32 days, the majority of participants judge that the number of topics covered was just enough. It was felt that the course would have benefited however from appreciation lectures, film shows; the presentation of research data showing the advantages of programmed instruction; more practical and simulation exercise; and further information concerning the newer approaches to educational technology. There was a general feeling that research data had lacked emphasis, and in the opinion of most more stress would have been beneficial. A larger display of programmed materials and further opportunities to read important texts and journals would also have been appreciated.

The participants felt that more time should have been allocated to practical work in the techniques of programme preparation, and in the demonstration and techniques of presentation devices and audio-visual aids. They appreciated the general organization and administration of the workshop.

7. An encouraging number of research projects were suggested by participants to be investigated as soon as possible. Most of the research projects suggested were of an applied nature, and the evaluation committee feels that twenty of them are feasible; in addition one fundamental research project was put forward.

This response indicates that the workshop has been successful in providing functional orientation towards applied research, at least to the extent that the participants feel the need of applied research at the present juncture.

8. When asked to outline a course of lectures for the training of programme writers, the responses of the participants indicated that they have a clear perception of the training courses which might be useful for their respective countries. The topics suggested were mostly relevant and in proper sequence; some showed thoughtful originality and divergence from the programme of this workshop. It may be concluded that the workshop has been successful in providing consideration of the coverage and duration of training topics.

Similar conclusions may be drawn concerning the practical activities considered relevant to such courses. There is a salutory consistency between the expression of needs felt during the workshop with the suggested exercises. The responses also indicated a realistic appraisal of the questions which should be anticipated when initiating programmed instruction.

The participants also tend to perceive the importance of team work and coordination in the development of programmed instruction, although this aspect has not been explored during the lectures and discussion sessions during the workshop. Facility and fluency in communication and expression, expertise in subject matter, and skill in frame writing were all perceived to be necessary in a programmer, in addition to an objective outlook towards self examination. The workshop has therefore succeeded in giving a functional approach towards the efficient selection of people for endeavours in this field.

9. The conception of programmed instruction indicated by the suggested advantages of the system can only be described as disappointing. About half of the participants responded relevantly when asked to list the major advantages of the method; it cannot be assumed that all of these were a direct result of the workshop. The committee feels that presentation of research data in this context needs emphasis in future workshop schedules. It might be considered worthwhile to consider alternative means by which information on the advantages of programmed instruction could be circulated to participants, supplementary to the workshop course.

. Similarly the limitations of programmed instruction have been disappointingly described.

10. Participants were asked to outline the stages for introducing programmed instruction into a country which has not made any previous endeavour in the field, and at a later stage in the questionnaire, how they would involve uninitiated institutions in programmed instruction. About half of the participants identified the stages in each case in terms of initial appreciation, followed by training, research and development. However, the tendency to emphasise appreciation was more general, and to this extent the workshop has been successful in this area.

About half of the participants referred to major difficulties to be anticipated in terms of finance, expertise and overcoming resistance to change. The differences in syllabi among Asian countries, and in languages also within countries, are also basic problems. It is remarkable that among the responses there were no references to political problems, or curriculum analysis, and this is encouraging. An early task for the consultative committee could be the initiation of adequate documentation, and the establishment of a clearing house for existing curricula, to form a basis for need analysis and trouble shooting for particular subject matter areas.

11. Only a few participants could specify subject matter topics within broad areas (such as 'modern mathematics for lower secondary schools) so the workshop cannot be considered to have been successful inestablishing principles for the most successful choice of topics.

As to the development of programmes, there is an optimistic view of expected trends in development in the first five years in about half of the replies, although the range of future estimates is wide.

Adaptation of available programmes seemed to be feasible to about half the participants. It is felt from the responses studied that the workshop has not succeeded altogether in providing a basis for working out the development of programmes for a "programme bank" for the whole of Asia. It would be beneficial if the exact ways of developing such a bank could be outlined through following articles in an appropriate newsletter to compensate for this.

12. Participants were asked to indicate the countries they felt they could cooperate within a range of activities both immediately and in five years' time. Collaboration was perceived in narrow circles in general, although some subregional clusters could be identified. Although narrower groups tend to be more functional, the objective of the workshop has been to foster a regional conception and involvement. The consultative committee may design lectures and other inputs to encourage the broadening of this collaborative field. The involvement of people and institutions has not yet emerged as a clear product of the workshop, although the participants do on the whole tend to perceive the future in terms of an increasing involvement of both people and institutions in programmed instruction and related techniques. This may partly be due to inadequate perception of the activities involved beyond appreciation conferences, training courses and the like, especially in terms of their own particular roles. Under these circumstances it is hoped that sufficient guidelines will be available for the formation of a basic task force, the dissemination of information, activities for research, and the application of programmed learning to all relevant areas of education.